SEQUENCE LISTING

<110> Garvan Institute of Medical Research

       HERZOG, Herbert

<120> Novel G-protein coupled receptor-encoding gene and diagnostic uses
therefor

<130> 1871-132 (93702-CIP/MRO)

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                                              Met Thr Pro Gln
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tcg ctg ctg cag acg aca ctg ttc ctg ctg agt ctg ctc ttc ctg gtc   222
Ser Leu Leu Gln Thr Thr Leu Phe Leu Leu Ser Leu Leu Phe Leu Val
5   10   15   20

caa ggt gcc cac ggc agg ggc cac agg gaa gac ttt cgc ttc tgc agc   270
Gln Gly Ala His Gly Arg Gly His Arg Glu Asp Phe Arg Phe Cys Ser
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cag cgg aac cag aca cac agg agc agc ctc cac tac aaa ccc aca cca   318
Gln Arg Asn Gln Thr His Arg Ser Ser Leu His Tyr Lys Pro Thr Pro

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        gac ctg cgc atc tcc atc gag aac tcc gaa gag gcc ctc aca gtc cat        366
        Asp Leu Arg Ile Ser Ile Glu Asn Ser Glu Glu Ala Leu Thr Val His
    5           55                  60                  65

        gcc cct ttc cct gca gcc cac cct gct tcc cga tcc ttc cct gac ccc        414
        Ala Pro Phe Pro Ala Ala His Pro Ala Ser Arg Ser Phe Pro Asp Pro
            70                  75                  80
    10
        agg ggc ctc tac cac ttc tgc ctc tac tgg aac cga cat gct ggg aga        462
        Arg Gly Leu Tyr His Phe Cys Leu Tyr Trp Asn Arg His Ala Gly Arg
        85                  90                  95                  100

    15  tta cat ctt ctc tat ggc aag cgt gac ttc ttg ctg agt gac aaa gcc        510
        Leu His Leu Leu Tyr Gly Lys Arg Asp Phe Leu Leu Ser Asp Lys Ala
                        105                 110                 115

        tct agc ctc ctc tgc ttc cag cac cag gag gag agc ctg gct cag ggc        558
    20  Ser Ser Leu Leu Cys Phe Gln His Gln Glu Glu Ser Leu Ala Gln Gly
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        ccc ccg ctg tta gcc act tct gtc acc tcc tgg tgg agc cct cag aac        606
        Pro Pro Leu Leu Ala Thr Ser Val Thr Ser Trp Trp Ser Pro Gln Asn
    25          135                 140                 145

        atc agc ctg ccc agt gcc gcc agc ttc acc ttc tcc ttc cac agt cct        654
        Ile Ser Leu Pro Ser Ala Ala Ser Phe Thr Phe Ser Phe His Ser Pro
            150                 155                 160
    30
        ccc cac acg gcc gct cac aat gcc tcg gtg gac atg tgc gag ctc aaa        702
        Pro His Thr Ala Ala His Asn Ala Ser Val Asp Met Cys Glu Leu Lys
        165                 170                 175                 180

    35  agg gac ctc cag ctg ctc agc cag ttc ctg aag cat ccc cag aag gcc        750
        Arg Asp Leu Gln Leu Leu Ser Gln Phe Leu Lys His Pro Gln Lys Ala
                        185                 190                 195

        tca agg agg ccc tcg gct gcc ccc gcc agc cag cag ttg cag agc ctg        798
    40  Ser Arg Arg Pro Ser Ala Ala Pro Ala Ser Gln Gln Leu Gln Ser Leu
                    200                 205                 210

        gag tcg aaa ctg acc tct gtg aga ttc atg ggg gac atg gtg tcc ttc        846
        Glu Ser Lys Leu Thr Ser Val Arg Phe Met Gly Asp Met Val Ser Phe
    45          215                 220                 225

        gag gag gac cgg atc aac gcc acg gta tgg aag ctc cag ccc aca gcc        894
        Glu Glu Asp Arg Ile Asn Ala Thr Val Trp Lys Leu Gln Pro Thr Ala
            230                 235                 240
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        ggc ctc cag gac ctg cac atc cac tcc cgg cag gag gag gag cag agc        942
        Gly Leu Gln Asp Leu His Ile His Ser Arg Gln Glu Glu Glu Gln Ser
        245                 250                 255                 260
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     gag atc atg gag tac tcg gtg ctg ctg cct cga aca ctc ttc cag agg        990
     Glu Ile Met Glu Tyr Ser Val Leu Leu Pro Arg Thr Leu Phe Gln Arg
                     265             270             275

 5   acg aaa ggc cgg agc ggg gag gct gag aag aga ctc ctc ctg gtg gac       1038
     Thr Lys Gly Arg Ser Gly Glu Ala Glu Lys Arg Leu Leu Leu Val Asp
                 280             285             290

10   ttc agc agc caa gcc ctg ttc cag gac aag aat tcc agc caa gtc ctg       1086
     Phe Ser Ser Gln Ala Leu Phe Gln Asp Lys Asn Ser Ser Gln Val Leu
                 295             300             305

     ggt gag aag gtc ttg ggg att gtg gta cag aac acc aaa gta gcc aac       1134
15   Gly Glu Lys Val Leu Gly Ile Val Val Gln Asn Thr Lys Val Ala Asn
             310             315             320

     ctc acg gag ccc gtg gtg ctc act ttc cag cac cag cta cag ccg aag       1182
     Leu Thr Glu Pro Val Val Leu Thr Phe Gln His Gln Leu Gln Pro Lys
20   325                 330             335                 340

     aat gtg act ctg caa tgt gtg ttc tgg gtt gaa gac ccc aca ttg agc       1230
     Asn Val Thr Leu Gln Cys Val Phe Trp Val Glu Asp Pro Thr Leu Ser
                     345             350             355
25
     agc ccg ggg cat tgg agc agt gct ggg tgt gag acc gtc agg aga gaa       1278
     Ser Pro Gly His Trp Ser Ser Ala Gly Cys Glu Thr Val Arg Arg Glu
                 360             365             370

30   acc caa aca tcc tgc ttc tgc aac cac ttg acc tac ttt gca gtg ctg       1326
     Thr Gln Thr Ser Cys Phe Cys Asn His Leu Thr Tyr Phe Ala Val Leu
                 375             380             385

     atg gtc tcc tcg gtg gag gtg gac gcc gtg cac aag cac tac ctg agc       1374
35   Met Val Ser Ser Val Glu Val Asp Ala Val His Lys His Tyr Leu Ser
             390             395             400

     ctc ctc tcc tac gtg ggc tgt gtc gtc tct gcc ctg gcc tgc ctt gtc       1422
     Leu Leu Ser Tyr Val Gly Cys Val Val Ser Ala Leu Ala Cys Leu Val
40   405                 410             415                 420

     acc att gcc gcc tac ctc tgc tcc agg gtg ccc ctg ccg tgc agg agg       1470
     Thr Ile Ala Ala Tyr Leu Cys Ser Arg Val Pro Leu Pro Cys Arg Arg
                     425             430             435
45
     aaa cct cgg gac tac acc atc aag gtg cac atg aac ctg ctg ctg gcc       1518
     Lys Pro Arg Asp Tyr Thr Ile Lys Val His Met Asn Leu Leu Leu Ala
                 440             445             450

50   gtc ttc ctg ctg gac acg agc ttc ctg ctc agc gag ccg gtg gcc ctg       1566
     Val Phe Leu Leu Asp Thr Ser Phe Leu Leu Ser Glu Pro Val Ala Leu
                 455             460             465
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    aca ggc tct gag gct ggc tgc cga gcc agt gcc atc ttc ctg cac ttc      1614
    Thr Gly Ser Glu Ala Gly Cys Arg Ala Ser Ala Ile Phe Leu His Phe
        470             475             480

 5  tcc ctg ctc acc tgc ctt tcc tgg atg ggc ctc gag ggg tac aac ctc      1662
    Ser Leu Leu Thr Cys Leu Ser Trp Met Gly Leu Glu Gly Tyr Asn Leu
    485             490             495             500

    tac cga ctc gtg gtg gag gtc ttt ggc acc tat gtc cct ggc tac cta      1710
10  Tyr Arg Leu Val Val Glu Val Phe Gly Thr Tyr Val Pro Gly Tyr Leu
                505             510             515

    ctc aag ctg agc gcc atg ggc tgg ggc ttc ccc atc ttt ctg gtg acg      1758
    Leu Lys Leu Ser Ala Met Gly Trp Gly Phe Pro Ile Phe Leu Val Thr
15              520             525             530

    ctg gtg gcc ctg gtg gat gtg gac aac tat ggc ccc atc atc ttg gct      1806
    Leu Val Ala Leu Val Asp Val Asp Asn Tyr Gly Pro Ile Ile Leu Ala
                535             540             545
20
    gtg cat agg act cca gag ggc gtc atc tac cct tcc atg tgc tgg atc      1854
    Val His Arg Thr Pro Glu Gly Val Ile Tyr Pro Ser Met Cys Trp Ile
        550             555             560

25  cgg gac tcc ctg gtc agc tac atc acc aac ctg ggc ctc ttc agc ctg      1902
    Arg Asp Ser Leu Val Ser Tyr Ile Thr Asn Leu Gly Leu Phe Ser Leu
    565             570             575             580

    gtg ttt ctg ttc aac atg gcc atg cta gcc acc atg gtg gtg cag atc      1950
30  Val Phe Leu Phe Asn Met Ala Met Leu Ala Thr Met Val Val Gln Ile
                585             590             595

    ctg cgg ctg cgc ccc cac acc caa aag tgg tca cat gtg ctg aca ctg      1998
    Leu Arg Leu Arg Pro His Thr Gln Lys Trp Ser His Val Leu Thr Leu
35          600             605             610

    ctg ggc ctc agc ctg gtc ctt ggc ctg ccc tgg gcc ttg atc ttc ttc      2046
    Leu Gly Leu Ser Leu Val Leu Gly Leu Pro Trp Ala Leu Ile Phe Phe
                615             620             625
40
    tcc ttt gct tct ggc acc ttc cag ctt gtc gtc ctc tac ctt ttc agc      2094
    Ser Phe Ala Ser Gly Thr Phe Gln Leu Val Val Leu Tyr Leu Phe Ser
        630             635             640

45  atc atc acc tcc ttc caa ggc ttc ctc atc ttc atc tgg tac tgg tcc      2142
    Ile Ile Thr Ser Phe Gln Gly Phe Leu Ile Phe Ile Trp Tyr Trp Ser
    645             650             655             660

    atg cgg ctg cag gcc cgg ggt ggc ccc tcc cct ctg aag agc aac tca      2190
50  Met Arg Leu Gln Ala Arg Gly Gly Pro Ser Pro Leu Lys Ser Asn Ser
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    gac tgc gcc agg ctc ccc atc agc tcg ggc agc acc tcg tcc agc cgc      2238
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    Ile
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        cgcacactgc ctgtggcccc cgagccaggc ccagccccag gccagtcagc cgcagacttt     2351

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        ggggcttttg aattggcctt ggggactact cggctctcac tcagctccca cgggactcag     2471

        aagtgcgccg ccatgctgcc tagggtactg tccccacatc tgtcccaacc cagctggagg     2531

        cctggtctct ccttacaacc cctgggccca gcctcattgc tgggggccag gccttggatc     2591

        ttgagggtct ggcacatcct taatcctgtg cccctgcctg ggacagaaat gtggctccag     2651

        ttgctctgtc tctcgtggtc accctgaggg cactctgcat cctctgtcat tttaacctca     2711

        ggtggcaccc agggcgaatg gggcccaggg cagaccttca gggccagagc cctggcggag     2771

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                    20                  25                  30
```

```
        Arg Phe Cys Ser Gln Arg Asn Gln Thr His Arg Ser Ser Leu His Tyr
                    35                  40                  45
```

```
        Lys Pro Thr Pro Asp Leu Arg Ile Ser Ile Glu Asn Ser Glu Glu Ala
                    50                  55                  60
```

```
    Leu Thr Val His Ala Pro Phe Pro Ala Ala His Pro Ala Ser Arg Ser
    65              70              75              80

5

    Phe Pro Asp Pro Arg Gly Leu Tyr His Phe Cys Leu Tyr Trp Asn Arg
                    85              90              95

10  His Ala Gly Arg Leu His Leu Leu Tyr Gly Lys Arg Asp Phe Leu Leu
                100             105             110

    Ser Asp Lys Ala Ser Ser Leu Leu Cys Phe Gln His Gln Glu Glu Ser
15          115             120             125

    Leu Ala Gln Gly Pro Pro Leu Leu Ala Thr Ser Val Thr Ser Trp Trp
        130             135             140
20

    Ser Pro Gln Asn Ile Ser Leu Pro Ser Ala Ala Ser Phe Thr Phe Ser
    145             150             155             160
25

    Phe His Ser Pro Pro His Thr Ala Ala His Asn Ala Ser Val Asp Met
                    165             170             175

30  Cys Glu Leu Lys Arg Asp Leu Gln Leu Leu Ser Gln Phe Leu Lys His
                180             185             190

    Pro Gln Lys Ala Ser Arg Arg Pro Ser Ala Ala Pro Ala Ser Gln Gln
35          195             200             205

    Leu Gln Ser Leu Glu Ser Lys Leu Thr Ser Val Arg Phe Met Gly Asp
        210             215             220
40

    Met Val Ser Phe Glu Glu Asp Arg Ile Asn Ala Thr Val Trp Lys Leu
    225             230             235             240
45

    Gln Pro Thr Ala Gly Leu Gln Asp Leu His Ile His Ser Arg Gln Glu
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50  Glu Glu Gln Ser Glu Ile Met Glu Tyr Ser Val Leu Leu Pro Arg Thr
                260             265             270
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```
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             290             295             300


     Ser Gln Val Leu Gly Glu Lys Val Leu Gly Ile Val Val Gln Asn Thr
 10  305             310             315             320


     Lys Val Ala Asn Leu Thr Glu Pro Val Val Leu Thr Phe Gln His Gln
                 325             330             335
 15

     Leu Gln Pro Lys Asn Val Thr Leu Gln Cys Val Phe Trp Val Glu Asp
                 340             345             350
 20

     Pro Thr Leu Ser Ser Pro Gly His Trp Ser Ser Ala Gly Cys Glu Thr
             355             360             365


 25  Val Arg Arg Glu Thr Gln Thr Ser Cys Phe Cys Asn His Leu Thr Tyr
             370             375             380


     Phe Ala Val Leu Met Val Ser Ser Val Glu Val Asp Ala Val His Lys
 30  385             390             395             400


     His Tyr Leu Ser Leu Leu Ser Tyr Val Gly Cys Val Val Ser Ala Leu
                 405             410             415
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     Ala Cys Leu Val Thr Ile Ala Ala Tyr Leu Cys Ser Arg Val Pro Leu
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     Pro Cys Arg Arg Lys Pro Arg Asp Tyr Thr Ile Lys Val His Met Asn
             435             440             445


 45  Leu Leu Leu Ala Val Phe Leu Leu Asp Thr Ser Phe Leu Leu Ser Glu
             450             455             460


     Pro Val Ala Leu Thr Gly Ser Glu Ala Gly Cys Arg Ala Ser Ala Ile
 50  465             470             475             480


     Phe Leu His Phe Ser Leu Leu Thr Cys Leu Ser Trp Met Gly Leu Glu
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                    485   490   495

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        Pro Gly Tyr Leu Leu Lys Leu Ser Ala Met Gly Trp Gly Phe Pro Ile
                515   520   525
    10

        Phe Leu Val Thr Leu Val Ala Leu Val Asp Val Asp Asn Tyr Gly Pro
                530   535   540

    15
        Ile Ile Leu Ala Val His Arg Thr Pro Glu Gly Val Ile Tyr Pro Ser
        545   550   555   560

    20 Met Cys Trp Ile Arg Asp Ser Leu Val Ser Tyr Ile Thr Asn Leu Gly
                        565   570   575

        Leu Phe Ser Leu Val Phe Leu Phe Asn Met Ala Met Leu Ala Thr Met
                580   585   590
    25

        Val Val Gln Ile Leu Arg Leu Arg Pro His Thr Gln Lys Trp Ser His
                595   600   605
    30

        Val Leu Thr Leu Leu Gly Leu Ser Leu Val Leu Gly Leu Pro Trp Ala
                610   615   620

    35
        Leu Ile Phe Phe Ser Phe Ala Ser Gly Thr Phe Gln Leu Val Val Leu
        625   630   635   640

    40 Tyr Leu Phe Ser Ile Ile Thr Ser Phe Gln Gly Phe Leu Ile Phe Ile
                        645   650   655

        Trp Tyr Trp Ser Met Arg Leu Gln Ala Arg Gly Gly Pro Ser Pro Leu
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        ctgggattac aggtggtgac ttccaagagt gactccgtcg aggaaa atg act ccc        176
                                                            Met Thr Pro
 30                                                          1

        cag tcg ctg ctg cag acg aca ctg ttc ctg ctg agt ctg ctc ttc ctg      224
        Gln Ser Leu Leu Gln Thr Thr Leu Phe Leu Leu Ser Leu Leu Phe Leu
            5               10                  15
 35
        gtc caa ggt gcc cac ggc agg ggc cac agg gaa gac ttt cgc ttc tgc      272
        Val Gln Gly Ala His Gly Arg Gly His Arg Glu Asp Phe Arg Phe Cys
         20              25                  30                  35

 40     agc cag cgg aac cag aca cac agg agc agc ctc cac tac aaa ccc aca      320
        Ser Gln Arg Asn Gln Thr His Arg Ser Ser Leu His Tyr Lys Pro Thr
                        40                  45                  50

        cca gac ctg cgc atc tcc atc gag aac tcc gaa gag gcc ctc aca gtc      368
 45     Pro Asp Leu Arg Ile Ser Ile Glu Asn Ser Glu Glu Ala Leu Thr Val
                        55                  60                  65

        cat gcc cct ttc cct gca gcc cac cct gct tcc cga tcc ttc cct gac      416
        His Ala Pro Phe Pro Ala Ala His Pro Ala Ser Arg Ser Phe Pro Asp
 50                 70                  75                  80

        ccc agg ggc ctc tac cac ttc tgc ctc tac tgg aac cga cat gct ggg      464
        Pro Arg Gly Leu Tyr His Phe Cys Leu Tyr Trp Asn Arg His Ala Gly
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                85                      90                      95

      aga tta cat ctt ctc tat ggc aag cgt gac ttc ttg ctg agt gac aaa      512
      Arg Leu His Leu Leu Tyr Gly Lys Arg Asp Phe Leu Leu Ser Asp Lys
  5   100                 105                 110                 115

      gcc tct agc ctc ctc tgc ttc cag cac cag gag gag agc ctg gct cag      560
      Ala Ser Ser Leu Leu Cys Phe Gln His Gln Glu Glu Ser Leu Ala Gln
                          120                 125                 130
 10
      ggc ccc ccg ctg tta gcc act tct gtc acc tcc tgg tgg agc cct cag      608
      Gly Pro Pro Leu Leu Ala Thr Ser Val Thr Ser Trp Trp Ser Pro Gln
                      135                 140                 145

 15   aac atc agc ctg ccc agt gcc gcc agc ttc acc ttc tcc ttc cac agt      656
      Asn Ile Ser Leu Pro Ser Ala Ala Ser Phe Thr Phe Ser Phe His Ser
                      150                 155                 160

      cct ccc cac acg gcc gct cac aat gcc tcg gtg gac atg tgc gag ctc      704
 20   Pro Pro His Thr Ala Ala His Asn Ala Ser Val Asp Met Cys Glu Leu
                  165                 170                 175

      aaa agg gac ctc cag ctg ctc agc cag ttc ctg aag cat ccc cag aag      752
      Lys Arg Asp Leu Gln Leu Leu Ser Gln Phe Leu Lys His Pro Gln Lys
 25   180                 185                 190                 195

      gcc tca agg agg ccc tcg gct gcc ccc gcc agc cag cag ttg cag agc      800
      Ala Ser Arg Arg Pro Ser Ala Ala Pro Ala Ser Gln Gln Leu Gln Ser
                          200                 205                 210
 30
      ctg gag tcg aaa ctg acc tct gtg aga ttc atg ggg gac atg gtg tcc      848
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                      215                 220                 225

 35   ttc gag gag gac cgg atc aac gcc acg gtg tgg aag ctc cag ccc aca      896
      Phe Glu Glu Asp Arg Ile Asn Ala Thr Val Trp Lys Leu Gln Pro Thr
                  230                 235                 240

      gcc ggc ctc cag gac ctg cac atc cac tcc cgg cag gag gag gag cag      944
 40   Ala Gly Leu Gln Asp Leu His Ile His Ser Arg Gln Glu Glu Glu Gln
              245                 250                 255

      agc gag atc atg gag tac tcg gtg ctg ctg cct cga aca ctc ttc cag      992
      Ser Glu Ile Met Glu Tyr Ser Val Leu Leu Pro Arg Thr Leu Phe Gln
 45   260                 265                 270                 275

      agg acg aaa ggc cgg agc ggg gag gct gag aag aga ctc ctc ctg gtg     1040
      Arg Thr Lys Gly Arg Ser Gly Glu Ala Glu Lys Arg Leu Leu Leu Val
                          280                 285                 290
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      gac ttc agc agc caa gcc ctg ttc cag gac aag aat tcc agc cac gtc     1088
      Asp Phe Ser Ser Gln Ala Leu Phe Gln Asp Lys Asn Ser Ser His Val
                      295                 300                 305
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ctg ggt gag aag gtc ttg ggg att gtg gta cag aac acc aaa gta gcc    1136
Leu Gly Glu Lys Val Leu Gly Ile Val Val Gln Asn Thr Lys Val Ala
        310             315             320

aac ctc acg gag ccc gtg gtg ctc acc ttc cag cac cag cta cag ccg    1184
Asn Leu Thr Glu Pro Val Val Leu Thr Phe Gln His Gln Leu Gln Pro
        325             330             335

aag aat gtg act ctg caa tgt gtg ttc tgg gtt gaa gac ccc aca ttg    1232
Lys Asn Val Thr Leu Gln Cys Val Phe Trp Val Glu Asp Pro Thr Leu
340             345             350             355

agc agc ccg ggg cat tgg agc agt gct ggg tgt gag acc gtc agg aga    1280
Ser Ser Pro Gly His Trp Ser Ser Ala Gly Cys Glu Thr Val Arg Arg
                360             365             370

gaa acc caa aca tcc tgc ttc tgc aac cac ttg acc tac ttt gca gtg    1328
Glu Thr Gln Thr Ser Cys Phe Cys Asn His Leu Thr Tyr Phe Ala Val
            375             380             385

ctg atg gtc tcc tcg gtg gag gtg gac gcc gtg cac aag cac tac ctg    1376
Leu Met Val Ser Ser Val Glu Val Asp Ala Val His Lys His Tyr Leu
        390             395             400

agc ctc ctc tcc tac gtg ggc tgt gtc gtc tct gcc ctg gcc tgc ctt    1424
Ser Leu Leu Ser Tyr Val Gly Cys Val Val Ser Ala Leu Ala Cys Leu
        405             410             415

gtc acc att gcc gcc tac ctc tgc tcc agg gtg ccc ctg ccg tgc agg    1472
Val Thr Ile Ala Ala Tyr Leu Cys Ser Arg Val Pro Leu Pro Cys Arg
420             425             430             435

agg aaa cct cgg gac tac acc atc aag gtg cac atg aac ctg ctg ctg    1520
Arg Lys Pro Arg Asp Tyr Thr Ile Lys Val His Met Asn Leu Leu Leu
                440             445             450

gcc gtc ttc ctg ctg gac acg agc ttc ctg ctc agc gag ccg gtg gcc    1568
Ala Val Phe Leu Leu Asp Thr Ser Phe Leu Leu Ser Glu Pro Val Ala
            455             460             465

ctg aca ggc tct gag gct ggc tgc cga gcc agt gcc atc ttc ctg cac    1616
Leu Thr Gly Ser Glu Ala Gly Cys Arg Ala Ser Ala Ile Phe Leu His
        470             475             480

ttc tcc ctg ctc acc tgc ctt tcc tgg atg ggc ctc gag ggg tac aac    1664
Phe Ser Leu Leu Thr Cys Leu Ser Trp Met Gly Leu Glu Gly Tyr Asn
        485             490             495

ctc tac cga ctc gtg gtg gag gtc ttt ggc acc tat gtc cct ggc tac    1712
Leu Tyr Arg Leu Val Val Glu Val Phe Gly Thr Tyr Val Pro Gly Tyr
500             505             510             515
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    cta ctc aag ctg agc gcc atg ggc tgg ggc ttc ccc atc ttt ctg gtg    1760
    Leu Leu Lys Leu Ser Ala Met Gly Trp Gly Phe Pro Ile Phe Leu Val
                    520             525                 530

5   acg ctg gtg gcc ctg gtg gat gtg gac aac tat ggc ccc atc atc ttg    1808
    Thr Leu Val Ala Leu Val Asp Val Asp Asn Tyr Gly Pro Ile Ile Leu
                    535             540                 545

    gct gtg cat agg act cca gag ggc gtc atc tac cct tcc atg tgc tgg    1856
10  Ala Val His Arg Thr Pro Glu Gly Val Ile Tyr Pro Ser Met Cys Trp
                    550             555                 560

    atc cgg gac tcc ctg gtc agc tac atc acc aac ctg ggc ctc ttc agc    1904
    Ile Arg Asp Ser Leu Val Ser Tyr Ile Thr Asn Leu Gly Leu Phe Ser
15      565             570                 575

    ctg gtg ttt ctg ttc aac atg gcc atg cta gcc acc atg gtg gtg cag    1952
    Leu Val Phe Leu Phe Asn Met Ala Met Leu Ala Thr Met Val Val Gln
    580             585                 590                 595
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    atc ctg cgg ctg cgc ccc cac acc caa aag tgg tca cat gtg ctg aca    2000
    Ile Leu Arg Leu Arg Pro His Thr Gln Lys Trp Ser His Val Leu Thr
                    600             605                 610

25  ctg ctg ggc ctc agc ctg gtc ctt ggc ctg ccc tgg gcc ttg atc ttc    2048
    Leu Leu Gly Leu Ser Leu Val Leu Gly Leu Pro Trp Ala Leu Ile Phe
                    615                 620                 625

    ttc tcc ttt gct tct ggc acc ttc cag ctt gtc gtc ctc tac ctt ttc    2096
30  Phe Ser Phe Ala Ser Gly Thr Phe Gln Leu Val Val Leu Tyr Leu Phe
                    630                 635                 640

    agc atc atc acc tcc ttc caa ggc ttc ctc atc ttc atc tgg tac tgg    2144
    Ser Ile Ile Thr Ser Phe Gln Gly Phe Leu Ile Phe Ile Trp Tyr Trp
35      645                 650                 655

    tcc atg cgg ctg cag gcc cgg ggt ggc ccc tcc cct ctg aag agc aac    2192
    Ser Met Arg Leu Gln Ala Arg Gly Gly Pro Ser Pro Leu Lys Ser Asn
    660                 665                 670                 675
40
    tca gac agc gcc agg ctc ccc atc agc tcg ggc agc acc tcg tcc agc    2240
    Ser Asp Ser Ala Arg Leu Pro Ile Ser Ser Gly Ser Thr Ser Ser Ser
                    680                 685                 690

45  cgc atc taggcctcca gcccacctgc ccatgtgatg aagcagagat gcggcctcgt     2296
    Arg Ile

    cgcacactgc ctgtggcccc cgagccaggc ccagccccag gccagtcagc cgcagacttt   2356
50
    ggaaagccca acgaccatgg agagatgggc cgttgccatg gtggacggac tcccgggctg   2416

    ggcttttgaa ttggccttgg ggactactcg gctctcactc agctcccacg ggactcagaa   2476
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gtgcgccgcc atgctgccta gggtactgtc cccacatctg tcccaaccca gctggaggcc   2536

tggtctctcc ttacaaaccc tgggcccagc cctcattgct gggggccagg ccttggatct   2596

tgagggtctg gcacatcctt aatcctgtgc ccctgcctgg gacagaaatg tggctccagt   2656

tgctctgtct ctcgtggtca ccctgagggc actctgcatc ctctgtcatt ttaacctcag   2716

gtggcaccca gggcgaatgg ggcccagggc agaccttcag ggccagagcc ctggcggagg   2776

agaggccctt tgccaggagc acagcagcag ctcgcctacc tctgagccca ggcccctcc   2836

ctccctcagc cccccagtcc tccctccatc ttccctgggg ttctcctcct ctcccagggc   2896

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ggtttccagg agctgcctgg tgtctgctgt aaatgtttgt ctactgcaca agcctcggcc   3016

tgccctgag ccaggctcgg taccgatgcg tgggctgggc taggtccctc tgtccatctg   3076

ggcctttgta tgagctgcat tgcccttgct caccctgacc aagcacacgc ctcagagggg   3136

ccctcagcct ctcctgaagc cctcttgtgg caagaactgt ggaccatgcc agtcccgtct   3196

ggtttccatc ccaccactcc aaggactgag actgacctcc tctggtgaca ctggcctaga   3256

gcctgacact ctcctaagag gttctctcca agcccccaaa tagctccagg cgccctcggc   3316

cgcccatcat ggttaattct gtccaacaaa cacacacggg tagattgctg gcctgttgta   3376

ggtggtaggg acacagatga ccgacctggt cactcctcct gccaacattc agtctggtat   3436

gtgaggcgtg cgtgaagcaa gaactcctgg agctacaggg acagggagcc atcattcctg   3496

cctgggaatc ctggaagact tcctgcagga gtcagcgttc aatcttgacc ttgaagatgg   3556

gaaggatgtt cttttttacgt accaattctt ttgtcttttg atattaaaaa gaagtacatg   3616

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Arg Phe Cys Ser Gln Arg Asn Gln Thr His Arg Ser Ser Leu His Tyr
        35   40   45

Lys Pro Thr Pro Asp Leu Arg Ile Ser Ile Glu Asn Ser Glu Glu Ala
        50   55   60

Leu Thr Val His Ala Pro Phe Pro Ala Ala His Pro Ala Ser Arg Ser
65   70   75   80

Phe Pro Asp Pro Arg Gly Leu Tyr His Phe Cys Leu Tyr Trp Asn Arg
            85   90   95

His Ala Gly Arg Leu His Leu Leu Tyr Gly Lys Arg Asp Phe Leu Leu
        100   105   110

Ser Asp Lys Ala Ser Ser Leu Leu Cys Phe Gln His Gln Glu Glu Ser
        115   120   125

Leu Ala Gln Gly Pro Pro Leu Leu Ala Thr Ser Val Thr Ser Trp Trp
        130   135   140

Ser Pro Gln Asn Ile Ser Leu Pro Ser Ala Ala Ser Phe Thr Phe Ser
145   150   155   160

Phe His Ser Pro Pro His Thr Ala Ala His Asn Ala Ser Val Asp Met
            165   170   175

Cys Glu Leu Lys Arg Asp Leu Gln Leu Leu Ser Gln Phe Leu Lys His
        180   185   190

Pro Gln Lys Ala Ser Arg Arg Pro Ser Ala Ala Pro Ala Ser Gln Gln
        195   200   205

```
      Leu Gln Ser Leu Glu Ser Lys Leu Thr Ser Val Arg Phe Met Gly Asp
          210             215             220
  5

      Met Val Ser Phe Glu Glu Asp Arg Ile Asn Ala Thr Val Trp Lys Leu
      225             230             235                         240

 10
      Gln Pro Thr Ala Gly Leu Gln Asp Leu His Ile His Ser Arg Gln Glu
                      245             250             255

 15   Glu Glu Gln Ser Glu Ile Met Glu Tyr Ser Val Leu Leu Pro Arg Thr
                  260             265             270

      Leu Phe Gln Arg Thr Lys Gly Arg Ser Gly Glu Ala Glu Lys Arg Leu
 20       275             280             285

      Leu Leu Val Asp Phe Ser Ser Gln Ala Leu Phe Gln Asp Lys Asn Ser
          290             295             300
 25

      Ser His Val Leu Gly Glu Lys Val Leu Gly Ile Val Val Gln Asn Thr
      305             310             315                         320

 30
      Lys Val Ala Asn Leu Thr Glu Pro Val Val Leu Thr Phe Gln His Gln
                  325             330             335

 35   Leu Gln Pro Lys Asn Val Thr Leu Gln Cys Val Phe Trp Val Glu Asp
                  340             345             350

      Pro Thr Leu Ser Ser Pro Gly His Trp Ser Ser Ala Gly Cys Glu Thr
 40       355             360             365

      Val Arg Arg Glu Thr Gln Thr Ser Cys Phe Cys Asn His Leu Thr Tyr
          370             375             380
 45

      Phe Ala Val Leu Met Val Ser Ser Val Glu Val Asp Ala Val His Lys
      385             390             395                         400

 50
      His Tyr Leu Ser Leu Leu Ser Tyr Val Gly Cys Val Val Ser Ala Leu
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```

```
     Ala Cys Leu Val Thr Ile Ala Ala Tyr Leu Cys Ser Arg Val Pro Leu
             420                 425             430

 5
     Pro Cys Arg Arg Lys Pro Arg Asp Tyr Thr Ile Lys Val His Met Asn
             435                 440             445

10   Leu Leu Leu Ala Val Phe Leu Leu Asp Thr Ser Phe Leu Leu Ser Glu
             450                 455             460

     Pro Val Ala Leu Thr Gly Ser Glu Ala Gly Cys Arg Ala Ser Ala Ile
15   465                 470             475                 480

     Phe Leu His Phe Ser Leu Leu Thr Cys Leu Ser Trp Met Gly Leu Glu
                     485                 490                 495
20

     Gly Tyr Asn Leu Tyr Arg Leu Val Val Glu Val Phe Gly Thr Tyr Val
                 500                 505             510

25
     Pro Gly Tyr Leu Leu Lys Leu Ser Ala Met Gly Trp Gly Phe Pro Ile
             515                 520             525

30   Phe Leu Val Thr Leu Val Ala Leu Val Asp Val Asp Asn Tyr Gly Pro
             530                 535             540

     Ile Ile Leu Ala Val His Arg Thr Pro Glu Gly Val Ile Tyr Pro Ser
35   545                 550             555                 560

     Met Cys Trp Ile Arg Asp Ser Leu Val Ser Tyr Ile Thr Asn Leu Gly
                     565                 570                 575
40

     Leu Phe Ser Leu Val Phe Leu Phe Asn Met Ala Met Leu Ala Thr Met
                 580                 585             590

45
     Val Val Gln Ile Leu Arg Leu Arg Pro His Thr Gln Lys Trp Ser His
             595                 600             605

50   Val Leu Thr Leu Leu Gly Leu Ser Leu Val Leu Gly Leu Pro Trp Ala
             610                 615             620
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```
        Leu Ile Phe Phe Ser Phe Ala Ser Gly Thr Phe Gln Leu Val Val Leu
        625             630             635             640


   5    Tyr Leu Phe Ser Ile Ile Thr Ser Phe Gln Gly Phe Leu Ile Phe Ile
                        645             650             655


        Trp Tyr Trp Ser Met Arg Leu Gln Ala Arg Gly Gly Pro Ser Pro Leu
   10           660             665             670


        Lys Ser Asn Ser Asp Ser Ala Arg Leu Pro Ile Ser Ser Gly Ser Thr
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        Ser Ser Ser Arg Ile
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        gccttgaact cctgggctca agtgatcctt ccacctcagc ctccctagta gctgggacca     120
   45
        caggtggtga cttccaagag tgactccgtc ggaggaaa atg act ccc cag tcg ctg     176
                                                   Met Thr Pro Gln Ser Leu
                                                   1                   5

   50   ctg cag acg aca ctg ttc ctg ctg agt ctg ctc ttc ctg gtc caa ggt     224
        Leu Gln Thr Thr Leu Phe Leu Leu Ser Leu Leu Phe Leu Val Gln Gly
                        10              15              20
```

```
      gcc cac ggc agg ggc cac agg gaa gac ttt cgc ttc tgc agc cag cgg      272
      Ala His Gly Arg Gly His Arg Glu Asp Phe Arg Phe Cys Ser Gln Arg
              25                  30                  35

  5   aac cag aca cac agg agc agc ctc cac tac aaa ccc aca cca gac ctg      320
      Asn Gln Thr His Arg Ser Ser Leu His Tyr Lys Pro Thr Pro Asp Leu
              40                  45                  50

      cgc atc tcc atc gag aac tcc gaa gag gcc ctc aca gtc cat gcc cct      368
 10   Arg Ile Ser Ile Glu Asn Ser Glu Glu Ala Leu Thr Val His Ala Pro
      55                  60                  65                  70

      ttc cct gca gcc cac cct gct tcc cga tcc ttc cct gac ccc agg ggc      416
      Phe Pro Ala Ala His Pro Ala Ser Arg Ser Phe Pro Asp Pro Arg Gly
 15                   75                  80                  85

      ctc tac cac ttc tgc ctc tac tgg aac cga cat gct ggg aga tta cat      464
      Leu Tyr His Phe Cys Leu Tyr Trp Asn Arg His Ala Gly Arg Leu His
                      90                  95                  100
 20
      ctt ctc tat ggc aag cgt gac ttc ttg ctg agt gac aaa gcc tct agc      512
      Leu Leu Tyr Gly Lys Arg Asp Phe Leu Leu Ser Asp Lys Ala Ser Ser
                      105                 110                 115

 25   ctc ctc tgc ttc cag cac cag gag gag agc ctg gct cag ggc ccc ccg      560
      Leu Leu Cys Phe Gln His Gln Glu Glu Ser Leu Ala Gln Gly Pro Pro
              120                 125                 130

      ctg tta gcc act tct gtc acc tcc tgg tgg agc cct cag aac atc agc      608
 30   Leu Leu Ala Thr Ser Val Thr Ser Trp Trp Ser Pro Gln Asn Ile Ser
      135                 140                 145                 150

      ctg ccc agt gcc gcc agc ttc acc ttc tcc ttc cac agt cct ccc cac      656
      Leu Pro Ser Ala Ala Ser Phe Thr Phe Ser Phe His Ser Pro Pro His
                      155                 160                 165
 35
      acg gcc gct cac aat gcc tcg gtg gac atg tgc gag ctc aaa agg gac      704
      Thr Ala Ala His Asn Ala Ser Val Asp Met Cys Glu Leu Lys Arg Asp
                      170                 175                 180
 40
      ctc cag ctg ctc agc cag ttc ctg aag cat ccc cag aag gcc tca agg      752
      Leu Gln Leu Leu Ser Gln Phe Leu Lys His Pro Gln Lys Ala Ser Arg
              185                 190                 195

 45   agg ccc tcg gct gcc ccc gcc agc cag cag ttg cag agc ctg gag tcg      800
      Arg Pro Ser Ala Ala Pro Ala Ser Gln Gln Leu Gln Ser Leu Glu Ser
              200                 205                 210

      aaa ctg acc tct gtg aga ttc atg ggg gac atg gtg tcc ttc gag gag      848
 50   Lys Leu Thr Ser Val Arg Phe Met Gly Asp Met Val Ser Phe Glu Glu
      215                 220                 225                 230

      gac cgg atc aac gcc acg gtg tgg aag ctc cag ccc aca gcc ggc ctc      896
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```
      Asp Arg Ile Asn Ala Thr Val Trp Lys Leu Gln Pro Thr Ala Gly Leu
                      235             240             245

      cag gac ctg cac atc cac tcc cgg cag gag gag gag cag agc gag atc    944
 5    Gln Asp Leu His Ile His Ser Arg Gln Glu Glu Glu Gln Ser Glu Ile
                      250             255             260

      atg gag tac tcg gtg ctg ctg cct cga aca ctc ttc cag agg acg aaa    992
      Met Glu Tyr Ser Val Leu Leu Pro Arg Thr Leu Phe Gln Arg Thr Lys
 10           265             270             275

      ggc cgg agc ggg gag gct gag aag aga ctc ctc ctg gtg gac ttc agc   1040
      Gly Arg Ser Gly Glu Ala Glu Lys Arg Leu Leu Leu Val Asp Phe Ser
              280             285             290
 15
      agc caa gcc ctg ttc cag gac aag aat tcc agc caa gtc ctg ggt gag   1088
      Ser Gln Ala Leu Phe Gln Asp Lys Asn Ser Ser Gln Val Leu Gly Glu
      295                 300             305             310

 20   aag gtc ttg ggg att gtg gta cag aac acc aaa gta gcc aac ctc acg   1136
      Lys Val Leu Gly Ile Val Val Gln Asn Thr Lys Val Ala Asn Leu Thr
                      315             320             325

      gag ccc gtg gtg ctc act ttc cag cac cag cta cag ccg aag aat gtg   1184
 25   Glu Pro Val Val Leu Thr Phe Gln His Gln Leu Gln Pro Lys Asn Val
                      330             335             340

      act ctg caa tgt gtg ttc tgg gtt gaa gac ccc aca ttg agc agc ccg   1232
      Thr Leu Gln Cys Val Phe Trp Val Glu Asp Pro Thr Leu Ser Ser Pro
 30           345             350             355

      ggg cat tgg agc agt gct ggg tgt gag acc gtc agg aga gaa acc caa   1280
      Gly His Trp Ser Ser Ala Gly Cys Glu Thr Val Arg Arg Glu Thr Gln
              360             365             370
 35
      aca tcc tgc ttc tgc aac cac ttg acc tac ttt gca gtg ctg atg gtc   1328
      Thr Ser Cys Phe Cys Asn His Leu Thr Tyr Phe Ala Val Leu Met Val
      375                 380             385             390

 40   tcc tcg gtg gag gtg gac gcc gtg cac aag cac tac ctg agc ctc ctc   1376
      Ser Ser Val Glu Val Asp Ala Val His Lys His Tyr Leu Ser Leu Leu
                      395             400             405

      tcc tac gtg ggc tgt gtc gtc tct gcc ctg gcc tgc ctt gtc acc att   1424
 45   Ser Tyr Val Gly Cys Val Val Ser Ala Leu Ala Cys Leu Val Thr Ile
                      410             415             420

      gcc gcc tac ctc tgc tcc agg gtg ccc ctg ccg tgc agg agg aaa cct   1472
      Ala Ala Tyr Leu Cys Ser Arg Val Pro Leu Pro Cys Arg Arg Lys Pro
 50           425             430             435

      cgg gac tac acc atc aag gtg cac atg aac ctg ctg ctg gcc gtc ttc   1520
      Arg Asp Tyr Thr Ile Lys Val His Met Asn Leu Leu Leu Ala Val Phe
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                 440                    445                     450

        ctg ctg gac acg agc ttc ctg ctc agc gag ccg gtg gcc ctg aca ggc        1568
        Leu Leu Asp Thr Ser Phe Leu Leu Ser Glu Pro Val Ala Leu Thr Gly
    5   455                 460                 465                 470

        tct gag gct ggc tgc cga gcc agt gcc atc ttc ctg cac ttc tcc ctg        1616
        Ser Glu Ala Gly Cys Arg Ala Ser Ala Ile Phe Leu His Phe Ser Leu
                            475                 480                 485
    10
        ctc acc tgc ctt tcc tgg atg ggc ctc gag ggg tac aac ctc tac cga        1664
        Leu Thr Cys Leu Ser Trp Met Gly Leu Glu Gly Tyr Asn Leu Tyr Arg
                        490                 495                 500

    15  ctc gtg gtg gag gtc ttt ggc acc tat gtc cct ggc tac cta ctc aag        1712
        Leu Val Val Glu Val Phe Gly Thr Tyr Val Pro Gly Tyr Leu Leu Lys
                        505                 510                 515

        ctg agc gcc atg ggc tgg ggc ttc ccc atc ttt ctg gtg acg ctg gtg        1760
        Leu Ser Ala Met Gly Trp Gly Phe Pro Ile Phe Leu Val Thr Leu Val
    20                  520                 525                 530

        gcc ctg gtg gat gtg gac aac tat ggc ccc atc atc ttg gct gtg cat        1808
        Ala Leu Val Asp Val Asp Asn Tyr Gly Pro Ile Ile Leu Ala Val His
    25  535                 540                 545                 550

        agg act cca gag ggc gtc atc tac cct tcc atg tgc tgg atc cgg gac        1856
        Arg Thr Pro Glu Gly Val Ile Tyr Pro Ser Met Cys Trp Ile Arg Asp
                            555                 560                 565
    30
        tcc ctg gtc agc tac atc acc aac ctg ggc ctc ttc agc ctg gtg ttt        1904
        Ser Leu Val Ser Tyr Ile Thr Asn Leu Gly Leu Phe Ser Leu Val Phe
                        570                 575                 580

    35  ctg ttc aac atg gcc atg cta gcc acc atg gtg gtg cag atc ctg cgg        1952
        Leu Phe Asn Met Ala Met Leu Ala Thr Met Val Val Gln Ile Leu Arg
                        585                 590                 595

        ctg cgc ccc cac acc caa aag tgg tca cat gtg ctg aca ctg ctg ggc        2000
    40  Leu Arg Pro His Thr Gln Lys Trp Ser His Val Leu Thr Leu Leu Gly
            600                 605                 610

        ctc agc ctg gtc ctt ggc ctg ccc tgg gcc ttg atc ttc ttc tcc ttt        2048
        Leu Ser Leu Val Leu Gly Leu Pro Trp Ala Leu Ile Phe Phe Ser Phe
    45  615                 620                 625                 630

        gct tct ggc acc ttc cag ctt gtc gtc ctc tac ctt ttc agc atc atc        2096
        Ala Ser Gly Thr Phe Gln Leu Val Val Leu Tyr Leu Phe Ser Ile Ile
                            635                 640                 645
    50
        acc tcc ttc caa ggc ttc ctc atc ttc atc tgg tac tgg tcc atg cgg        2144
        Thr Ser Phe Gln Gly Phe Leu Ile Phe Ile Trp Tyr Trp Ser Met Arg
                            650                 655                 660
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ctg cag gcc cgg ggt ggc ccc tcc cct ctg aag agc aac tca gac agc     2192
Leu Gln Ala Arg Gly Gly Pro Ser Pro Leu Lys Ser Asn Ser Asp Ser
        665             670             675

gcc agg ctc ccc atc agc tcg ggc agc acc tcg tcc agc cgc atc         2237
Ala Arg Leu Pro Ile Ser Ser Gly Ser Thr Ser Ser Ser Arg Ile
        680             685             690
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taggcctcca gcccacctgc ccatgtgatg aagcagagat tcggcctcgt cgcacactgc   2297

ctgtggcccc cgagcccggc ccagccccag gccagtcagc cgcagacttt ggaaagccca   2357

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ttacaacccc tgggcccagc cctcattgct gggggccagg ccttggatct tgagggtctg   2597

gcacatcctt aatcctgtgc ccctgcctgg gacagaaatg tggctccagt tgctctgtct   2657

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Arg Phe Cys Ser Gln Arg Asn Gln Thr His Arg Ser Ser Leu His Tyr
            35   40   45

Lys Pro Thr Pro Asp Leu Arg Ile Ser Ile Glu Asn Ser Glu Glu Ala
    50   55   60

5

Leu Thr Val His Ala Pro Phe Pro Ala Ala His Pro Ala Ser Arg Ser
    65   70   75   80

10   Phe Pro Asp Pro Arg Gly Leu Tyr His Phe Cys Leu Tyr Trp Asn Arg
                  85   90   95

His Ala Gly Arg Leu His Leu Leu Tyr Gly Lys Arg Asp Phe Leu Leu
15   100   105   110

Ser Asp Lys Ala Ser Ser Leu Leu Cys Phe Gln His Gln Glu Glu Ser
       115   120   125
20

Leu Ala Gln Gly Pro Pro Leu Leu Ala Thr Ser Val Thr Ser Trp Trp
    130   135   140

25
Ser Pro Gln Asn Ile Ser Leu Pro Ser Ala Ala Ser Phe Thr Phe Ser
145   150   155   160

30   Phe His Ser Pro Pro His Thr Ala Ala His Asn Ala Ser Val Asp Met
                165   170   175

Cys Glu Leu Lys Arg Asp Leu Gln Leu Leu Ser Gln Phe Leu Lys His
35   180   185   190

Pro Gln Lys Ala Ser Arg Arg Pro Ser Ala Ala Pro Ala Ser Gln Gln
       195   200   205
40

Leu Gln Ser Leu Glu Ser Lys Leu Thr Ser Val Arg Phe Met Gly Asp
    210   215   220

45
Met Val Ser Phe Glu Glu Asp Arg Ile Asn Ala Thr Val Trp Lys Leu
225   230   235   240

50   Gln Pro Thr Ala Gly Leu Gln Asp Leu His Ile His Ser Arg Gln Glu
                245   250   255

```
     Glu Glu Gln Ser Glu Ile Met Glu Tyr Ser Val Leu Leu Pro Arg Thr
              260             265             270

 5   Leu Phe Gln Arg Thr Lys Gly Arg Ser Gly Glu Ala Glu Lys Arg Leu
              275             280             285

     Leu Leu Val Asp Phe Ser Ser Gln Ala Leu Phe Gln Asp Lys Asn Ser
10       290             295             300

     Ser Gln Val Leu Gly Glu Lys Val Leu Gly Ile Val Val Gln Asn Thr
     305             310             315             320
15

     Lys Val Ala Asn Leu Thr Glu Pro Val Val Leu Thr Phe Gln His Gln
              325             330             335

20
     Leu Gln Pro Lys Asn Val Thr Leu Gln Cys Val Phe Trp Val Glu Asp
              340             345             350

25   Pro Thr Leu Ser Ser Pro Gly His Trp Ser Ser Ala Gly Cys Glu Thr
              355             360             365

     Val Arg Arg Glu Thr Gln Thr Ser Cys Phe Cys Asn His Leu Thr Tyr
30       370             375             380

     Phe Ala Val Leu Met Val Ser Ser Val Glu Val Asp Ala Val His Lys
     385             390             395             400
35

     His Tyr Leu Ser Leu Leu Ser Tyr Val Gly Cys Val Val Ser Ala Leu
              405             410             415

40
     Ala Cys Leu Val Thr Ile Ala Ala Tyr Leu Cys Ser Arg Val Pro Leu
              420             425             430

45   Pro Cys Arg Arg Lys Pro Arg Asp Tyr Thr Ile Lys Val His Met Asn
              435             440             445

     Leu Leu Leu Ala Val Phe Leu Leu Asp Thr Ser Phe Leu Leu Ser Glu
50       450             455             460

     Pro Val Ala Leu Thr Gly Ser Glu Ala Gly Cys Arg Ala Ser Ala Ile
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        465                   470                   475                   480


  5   Phe Leu His Phe Ser Leu Leu Thr Cys Leu Ser Trp Met Gly Leu Glu
                    485               490               495


      Gly Tyr Asn Leu Tyr Arg Leu Val Val Glu Val Phe Gly Thr Tyr Val
 10               500               505               510


      Pro Gly Tyr Leu Leu Lys Leu Ser Ala Met Gly Trp Gly Phe Pro Ile
                515               520               525

 15
      Phe Leu Val Thr Leu Val Ala Leu Val Asp Val Asp Asn Tyr Gly Pro
                530               535               540


 20   Ile Ile Leu Ala Val His Arg Thr Pro Glu Gly Val Ile Tyr Pro Ser
      545               550               555               560


      Met Cys Trp Ile Arg Asp Ser Leu Val Ser Tyr Ile Thr Asn Leu Gly
 25                   565               570               575


      Leu Phe Ser Leu Val Phe Leu Phe Asn Met Ala Met Leu Ala Thr Met
                580               585               590
 30

      Val Val Gln Ile Leu Arg Leu Arg Pro His Thr Gln Lys Trp Ser His
                595               600               605

 35
      Val Leu Thr Leu Leu Gly Leu Ser Leu Val Leu Gly Leu Pro Trp Ala
                610               615               620


 40   Leu Ile Phe Phe Ser Phe Ala Ser Gly Thr Phe Gln Leu Val Val Leu
      625               630               635               640


      Tyr Leu Phe Ser Ile Ile Thr Ser Phe Gln Gly Phe Leu Ile Phe Ile
 45               645               650               655


      Trp Tyr Trp Ser Met Arg Leu Gln Ala Arg Gly Gly Pro Ser Pro Leu
                660               665               670
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      Lys Ser Asn Ser Asp Ser Ala Arg Leu Pro Ile Ser Ser Gly Ser Thr
                675               680               685
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        Ser Ser Ser Arg Ile
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        ctatagtctg cctgatgcca caaaggagtc cagggtctcg ctctgtcaca caggctggag     180

        tgcagtggtg tgatcttggc tcatcgtaac ctccacctcc cgggttcaag tgattctcat     240
 35
        gcctcagcct cccgagtagc tgggattaca ggtggtgact tccaagagtg actccgtcgg     300

        aggaaa atg act ccc cag tcg ctg ctg cag acg aca ctg ttc ctg ctg        348
               Met Thr Pro Gln Ser Leu Leu Gln Thr Thr Leu Phe Leu Leu
 40             1            · 5                      10

        agt ctg ctc ttc ctg gtc caa ggt gcc cac ggc agg ggc cac agg gaa      396
        Ser Leu Leu Phe Leu Val Gln Gly Ala His Gly Arg Gly His Arg Glu
        15                  20              25                  30
 45
        gac ttt cgc ttc tgc agc cag cgg aac cag aca cac agg agc agc ctc      444
        Asp Phe Arg Phe Cys Ser Gln Arg Asn Gln Thr His Arg Ser Ser Leu
                        35              40                  45

 50     cac tac aaa ccc aca cca gac ctg cgc atc tcc atc gag aac tcc gaa      492
        His Tyr Lys Pro Thr Pro Asp Leu Arg Ile Ser Ile Glu Asn Ser Glu
                    50              55                  60
```

```
     gag gcc ctc aca gtc cat gcc cct ttc cct gca gcc cac cct gct tcc      540
     Glu Ala Leu Thr Val His Ala Pro Phe Pro Ala Ala His Pro Ala Ser
              65                  70                  75

 5   cga tcc ttc cct gac ccc agg ggc ctc tac cac ttc tgc ctc tac tgg      588
     Arg Ser Phe Pro Asp Pro Arg Gly Leu Tyr His Phe Cys Leu Tyr Trp
              80                  85                  90

     aac cga cat gct ggg aga tta cat ctt ctc tat ggc aag cgt gac ttc      636
10   Asn Arg His Ala Gly Arg Leu His Leu Leu Tyr Gly Lys Arg Asp Phe
     95                  100                 105                 110

     ttg ctg agt gac aaa gcc tct agc ctc ctc tgc ttc cag cac cag gag      684
     Leu Leu Ser Asp Lys Ala Ser Ser Leu Leu Cys Phe Gln His Gln Glu
15                   115                 120                 125

     gag agc ctg gct cag ggc ccc ccg ctg tta gcc act tct gtc acc tcc      732
     Glu Ser Leu Ala Gln Gly Pro Pro Leu Leu Ala Thr Ser Val Thr Ser
                  130                 135                 140
20
     tgg tgg agc cct cag aac atc agc ctg ccc agt gcc gcc agc ttc acc      780
     Trp Trp Ser Pro Gln Asn Ile Ser Leu Pro Ser Ala Ala Ser Phe Thr
                  145                 150                 155

25   ttc tcc ttc cac agt cct ccc cac acg gcc gct cac aat gcc tcg gtg      828
     Phe Ser Phe His Ser Pro Pro His Thr Ala Ala His Asn Ala Ser Val
              160                 165                 170

     gac atg tgc gag ctc aaa agg gac ctc cag ctg ctc agc cag ttc ctg      876
30   Asp Met Cys Glu Leu Lys Arg Asp Leu Gln Leu Leu Ser Gln Phe Leu
     175                 180                 185                 190

     aag cat ccc cag aag gcc tca agg agg ccc tcg gct gcc ccc gcc agc      924
     Lys His Pro Gln Lys Ala Ser Arg Arg Pro Ser Ala Ala Pro Ala Ser
                  195                 200                 205
35
     cag cag ttg cag agc ctg gag tcg aaa ctg acc tct gtg aga ttc atg      972
     Gln Gln Leu Gln Ser Leu Glu Ser Lys Leu Thr Ser Val Arg Phe Met
                  210                 215                 220
40
     ggg gac atg gtg tcc ttc gag gag gac cgg atc aac gcc acg gtg tgg     1020
     Gly Asp Met Val Ser Phe Glu Glu Asp Arg Ile Asn Ala Thr Val Trp
                  225                 230                 235

45   aag ctc cag ccc aca gcc ggc ctc cag gac ctg cac atc cac tcc cgg     1068
     Lys Leu Gln Pro Thr Ala Gly Leu Gln Asp Leu His Ile His Ser Arg
              240                 245                 250

     cag gag gag gag cag agc gag atc atg gag tac tcg gtg ctg ctg cct     1116
50   Gln Glu Glu Glu Gln Ser Glu Ile Met Glu Tyr Ser Val Leu Leu Pro
     255                 260                 265                 270

     cga aca ctc ttc cag agg acg aaa ggc cgg agc ggg gag gct gag aag     1164
```

```
        Arg Thr Leu Phe Gln Arg Thr Lys Gly Arg Ser Gly Glu Ala Glu Lys
                        275             280             285

        aga ctc ctc ctg gtg gac ttc agc agc caa gcc ctg ttc cag gac aag    1212
    5   Arg Leu Leu Leu Val Asp Phe Ser Ser Gln Ala Leu Phe Gln Asp Lys
                        290             295             300

        aat tcc agc caa gtc ctg ggt gag aag gtc ttg ggg att gtg gta cag    1260
        Asn Ser Ser Gln Val Leu Gly Glu Lys Val Leu Gly Ile Val Val Gln
   10                   305             310             315

        aac acc aaa gta gcc aac ctc acg gag ccc gtg gtg ctc act ttc cag    1308
        Asn Thr Lys Val Ala Asn Leu Thr Glu Pro Val Val Leu Thr Phe Gln
                        320             325             330
   15
        cac cag cta cag ccg aag aat gtg act ctg caa tgt gtg ttc tgg gtt    1356
        His Gln Leu Gln Pro Lys Asn Val Thr Leu Gln Cys Val Phe Trp Val
        335                 340             345                 350

   20   gaa gac ccc aca ttg agc agc ccg ggg cat tgg agc agt gct ggg tgt    1404
        Glu Asp Pro Thr Leu Ser Ser Pro Gly His Trp Ser Ser Ala Gly Cys
                            355             360                 365

        gag acc gtc agg aga gaa acc caa aca tcc tgc ttc tgc aac cac ttg    1452
   25   Glu Thr Val Arg Arg Glu Thr Gln Thr Ser Cys Phe Cys Asn His Leu
                        370             375             380

        acc tac ttt gca gtg ctg atg gtc tcc tcg gtg gag gtg gac gcc gtg    1500
        Thr Tyr Phe Ala Val Leu Met Val Ser Ser Val Glu Val Asp Ala Val
   30               385             390             395

        cac aag cac tac ctg agc ctc ctc tcc tac gtg ggc tgt gtc gtc tct    1548
        His Lys His Tyr Leu Ser Leu Leu Ser Tyr Val Gly Cys Val Val Ser
                400             405             410
   35
        gcc ctg gcc tgc ctt gtc acc att gcc gcc tac ctc tgc tcc agg agg    1596
        Ala Leu Ala Cys Leu Val Thr Ile Ala Ala Tyr Leu Cys Ser Arg Arg
        415                 420             425                 430

   40   aaa cct cgg gac tac acc atc aag gtg cac atg aac ctg ctg ctg gcc    1644
        Lys Pro Arg Asp Tyr Thr Ile Lys Val His Met Asn Leu Leu Leu Ala
                        435             440                 445

        gtc ttc ctg ctg gac acg agc ttc ctg ctc agc gag ccg gtg gcc ctg    1692
   45   Val Phe Leu Leu Asp Thr Ser Phe Leu Leu Ser Glu Pro Val Ala Leu
                        450             455             460

        aca ggc tct gag gct ggc tgc cga gcc agt gcc atc ttc ctg cac ttc    1740
        Thr Gly Ser Glu Ala Gly Cys Arg Ala Ser Ala Ile Phe Leu His Phe
   50               465             470             475

        tcc ctg ctc acc tgc ctt tcc tgg atg ggc ctc gag ggg tac aac ctc    1788
        Ser Leu Leu Thr Cys Leu Ser Trp Met Gly Leu Glu Gly Tyr Asn Leu
```

```
              480                    485                      490

     tac cga ctc gtg gtg gag gtc ttt ggc acc tat gtc cct ggc tac cta      1836
     Tyr Arg Leu Val Val Glu Val Phe Gly Thr Tyr Val Pro Gly Tyr Leu
 5   495                 500                 505                 510

     ctc aag ctg agc gcc atg ggc tgg ggc ttc ccc atc ttt ctg gtg acg      1884
     Leu Lys Leu Ser Ala Met Gly Trp Gly Phe Pro Ile Phe Leu Val Thr
                         515                 520                 525
10
     ctg gtg gcc ctg gtg gat gtg gac aac tat ggc ccc atc atc ttg gct      1932
     Leu Val Ala Leu Val Asp Val Asp Asn Tyr Gly Pro Ile Ile Leu Ala
                         530                 535                 540

 15  gtg cat agg act cca gag ggc gtc atc tac cct tcc atg tgc tgg atc      1980
     Val His Arg Thr Pro Glu Gly Val Ile Tyr Pro Ser Met Cys Trp Ile
                         545                 550                 555

     cgg gac tcc ctg gtc agc tac atc acc aac ctg ggc ctc ttc agc ctg      2028
 20  Arg Asp Ser Leu Val Ser Tyr Ile Thr Asn Leu Gly Leu Phe Ser Leu
                         560                 565                 570

     gtg ttt ctg ttc aac atg gcc atg cta gcc acc atg gtg gtg cag atc      2076
     Val Phe Leu Phe Asn Met Ala Met Leu Ala Thr Met Val Val Gln Ile
 25  575                 580                 585                 590

     ctg cgg ctg cgc ccc cac acc caa aag tgg tca cat gtg ctg aca ctg      2124
     Leu Arg Leu Arg Pro His Thr Gln Lys Trp Ser His Val Leu Thr Leu
                         595                 600                 605
30
     ctg ggc ctc agc ctg gtc ctt ggc ctg ccc tgg gcc ttg atc ttc ttc      2172
     Leu Gly Leu Ser Leu Val Leu Gly Leu Pro Trp Ala Leu Ile Phe Phe
                         610                 615                 620

 35  tcc ttt gct tct ggc acc ttc cag ctt gtc gtc ctc tac ctt ttc agc      2220
     Ser Phe Ala Ser Gly Thr Phe Gln Leu Val Val Leu Tyr Leu Phe Ser
                         625                 630                 635

     atc atc acc tcc ttc caa ggc ttc ctc atc ttc atc tgg tac tgg tcc      2268
 40  Ile Ile Thr Ser Phe Gln Gly Phe Leu Ile Phe Ile Trp Tyr Trp Ser
                         640                 645                 650

     atg cgg ctg cag gcc cgg ggt ggc ccc tcc cct ctg aag agc aac tca      2316
     Met Arg Leu Gln Ala Arg Gly Gly Pro Ser Pro Leu Lys Ser Asn Ser
 45  655                 660                 665                 670

     gac agc gcc agg ctc ccc atc agc tcg ggc agc acc tcg tcc agc cgc      2364
     Asp Ser Ala Arg Leu Pro Ile Ser Ser Gly Ser Thr Ser Ser Ser Arg
                         675                 680                 685
50
     atc taggcctcca gcccacctgc ccatgtgatg aagcagagat gcggcctcgt           2417
     Ile
```

```
cgcacactgc ctgtggcccc cgagccaggc ccagccccag gccagtcagc cgcagacttt    2477

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ggcttttgaa ttggccttgg ggactactcg gctctcactc agctcccacg ggactcagaa    2597

gtgcgccgcc atgctgccta gggtactgtc cccacatctg tcccaaccca gctggaggcc    2657

tggtctctcc ttacaacccc tgggcccagc cctcattgct gggggccagg ccttggatct    2717

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gtggcaccca gggcgaatgg ggcccagggc agaccttcag ggccagagcc ctggcggagg    2897

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ctccctcagc cccccagtcc tccctccatc ttccctgggg ttctcctcct ctcccagggc    3017

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ccctcagcct ctcctgaagc cctcttgtgg caagaactgt ggaccatgcc agtcccgtct    3317

ggtttccatc ccaccactcc aaggactgag actgacctcc tctggtgaca ctggcctaga    3377

gcctgacact ctcctaagag gttctctcca agcccccaaa tagctccagg cgccctcggc    3437

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gaaggatgtt cttttttacgt accaattctt ttgtcttttg atattaaaaa gaagtacatg    3737

ttcattgtag agaatttgga aactgtagaa gagaatcaag aagaaaaata aaaatcagct    3797

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Leu Phe Leu Val Gln Gly Ala His Gly Arg Gly His Arg Glu Asp Phe
            20                  25                  30

Arg Phe Cys Ser Gln Arg Asn Gln Thr His Arg Ser Ser Leu His Tyr
        35                  40                  45

Lys Pro Thr Pro Asp Leu Arg Ile Ser Ile Glu Asn Ser Glu Glu Ala
    50                  55                  60

Leu Thr Val His Ala Pro Phe Pro Ala Ala His Pro Ala Ser Arg Ser
65                  70                  75                  80

Phe Pro Asp Pro Arg Gly Leu Tyr His Phe Cys Leu Tyr Trp Asn Arg
                85                  90                  95

His Ala Gly Arg Leu His Leu Leu Tyr Gly Lys Arg Asp Phe Leu Leu
            100                 105                 110

Ser Asp Lys Ala Ser Ser Leu Leu Cys Phe Gln His Gln Glu Glu Ser
        115                 120                 125

Leu Ala Gln Gly Pro Pro Leu Leu Ala Thr Ser Val Thr Ser Trp Trp
    130                 135                 140

Ser Pro Gln Asn Ile Ser Leu Pro Ser Ala Ala Ser Phe Thr Phe Ser
145                 150                 155                 160

Phe His Ser Pro Pro His Thr Ala Ala His Asn Ala Ser Val Asp Met
                165                 170                 175
```

```
        Cys Glu Leu Lys Arg Asp Leu Gln Leu Leu Ser Gln Phe Leu Lys His
                    180                 185                 190


  5     Pro Gln Lys Ala Ser Arg Arg Pro Ser Ala Ala Pro Ala Ser Gln Gln
                    195                 200                 205


        Leu Gln Ser Leu Glu Ser Lys Leu Thr Ser Val Arg Phe Met Gly Asp
 10             210                 215                 220


        Met Val Ser Phe Glu Glu Asp Arg Ile Asn Ala Thr Val Trp Lys Leu
        225                 230                 235                 240
 15

        Gln Pro Thr Ala Gly Leu Gln Asp Leu His Ile His Ser Arg Gln Glu
                        245                 250                 255

 20
        Glu Glu Gln Ser Glu Ile Met Glu Tyr Ser Val Leu Leu Pro Arg Thr
                    260                 265                 270


 25     Leu Phe Gln Arg Thr Lys Gly Arg Ser Gly Glu Ala Glu Lys Arg Leu
                    275                 280                 285


        Leu Leu Val Asp Phe Ser Ser Gln Ala Leu Phe Gln Asp Lys Asn Ser
 30             290                 295                 300


        Ser Gln Val Leu Gly Glu Lys Val Leu Gly Ile Val Val Gln Asn Thr
        305                 310                 315                 320
 35

        Lys Val Ala Asn Leu Thr Glu Pro Val Val Leu Thr Phe Gln His Gln
                        325                 330                 335

 40
        Leu Gln Pro Lys Asn Val Thr Leu Gln Cys Val Phe Trp Val Glu Asp
                    340                 345                 350


 45     Pro Thr Leu Ser Ser Pro Gly His Trp Ser Ser Ala Gly Cys Glu Thr
                    355                 360                 365


        Val Arg Arg Glu Thr Gln Thr Ser Cys Phe Cys Asn His Leu Thr Tyr
 50             370                 375                 380


        Phe Ala Val Leu Met Val Ser Ser Val Glu Val Asp Ala Val His Lys
```

```
        385                     390                     395                     400

        His Tyr Leu Ser Leu Leu Ser Tyr Val Gly Cys Val Val Ser Ala Leu
    5                   405             410                 415

        Ala Cys Leu Val Thr Ile Ala Ala Tyr Leu Cys Ser Arg Arg Lys Pro
   10                   420             425                 430

        Arg Asp Tyr Thr Ile Lys Val His Met Asn Leu Leu Leu Ala Val Phe
                        435             440                 445
   15
        Leu Leu Asp Thr Ser Phe Leu Leu Ser Glu Pro Val Ala Leu Thr Gly
                  450             455                 460

   20   Ser Glu Ala Gly Cys Arg Ala Ser Ala Ile Phe Leu His Phe Ser Leu
        465                 470                 475                 480

        Leu Thr Cys Leu Ser Trp Met Gly Leu Glu Gly Tyr Asn Leu Tyr Arg
   25                   485             490                 495

        Leu Val Val Glu Val Phe Gly Thr Tyr Val Pro Gly Tyr Leu Leu Lys
                        500             505                 510
   30
        Leu Ser Ala Met Gly Trp Gly Phe Pro Ile Phe Leu Val Thr Leu Val
                  515             520                 525

   35
        Ala Leu Val Asp Val Asp Asn Tyr Gly Pro Ile Ile Leu Ala Val His
                  530             535                 540

   40   Arg Thr Pro Glu Gly Val Ile Tyr Pro Ser Met Cys Trp Ile Arg Asp
        545                 550                 555                 560

        Ser Leu Val Ser Tyr Ile Thr Asn Leu Gly Leu Phe Ser Leu Val Phe
   45                   565             570                 575

        Leu Phe Asn Met Ala Met Leu Ala Thr Met Val Val Gln Ile Leu Arg
                        580             585                 590
   50
        Leu Arg Pro His Thr Gln Lys Trp Ser His Val Leu Thr Leu Leu Gly
                  595             600  .              605
```

```
        Leu Ser Leu Val Leu Gly Leu Pro Trp Ala Leu Ile Phe Phe Ser Phe
            610                 615             620
    5


        Ala Ser Gly Thr Phe Gln Leu Val Val Leu Tyr Leu Phe Ser Ile Ile
            625                 630             635                 640

    10
        Thr Ser Phe Gln Gly Phe Leu Ile Phe Ile Trp Tyr Trp Ser Met Arg
                        645             650             655


    15  Leu Gln Ala Arg Gly Gly Pro Ser Pro Leu Lys Ser Asn Ser Asp Ser
                    660             665             670


        Ala Arg Leu Pro Ile Ser Ser Gly Ser Thr Ser Ser Ser Arg Ile
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    45
        aagtccatgg agtctgaaga ctctgtcaag cctcgctagg aaacctagga gttttagagg     120

        gcacttggca ccggaagcta gccgggtagg cggagcctca cctggattga gttcacagct     180

    50  gcctagacag gctcagacta ggtgctgggc acctgggagg aggaggagac attagcagca     240

        aaggctgtta acagaagtgc ctgcctaggc ttggaggcaa gacgctgctg ttcacagtgc     300
```

```
      gagacggagg taggagtata atg gct gtc cag gtg ctg cgg cag atg gtc tac      353
                             Met Ala Val Gln Val Leu Arg Gln Met Val Tyr
                              1               5               10
```

```
 5    ttc cta ctg agt ctg ttt tct ctg gtg caa ggt gca cac agt ggc agc      401
      Phe Leu Leu Ser Leu Phe Ser Leu Val Gln Gly Ala His Ser Gly Ser
                   15              20              25
```

```
      ccc cga gaa gac ttc cgc ttc tgt ggc cag cgg aac cag acc caa cag      449
10    Pro Arg Glu Asp Phe Arg Phe Cys Gly Gln Arg Asn Gln Thr Gln Gln
                   30              35              40
```

```
      agc acc ctc cac tat gat caa tct tca gag cct cac atc ttt gtg tgg      497
      Ser Thr Leu His Tyr Asp Gln Ser Ser Glu Pro His Ile Phe Val Trp
15       45              50              55
```

```
      aac aca gag gag acc ctc aca att cgt gcc ccc ttc ctg gca gcc cca      545
      Asn Thr Glu Glu Thr Leu Thr Ile Arg Ala Pro Phe Leu Ala Ala Pro
      60              65              70              75
20
```

```
      gat att ccc cgc ttc ttc cca gag cct aga ggg ctc tat cac ttc tgc      593
      Asp Ile Pro Arg Phe Phe Pro Glu Pro Arg Gly Leu Tyr His Phe Cys
                        80              85              90
```

```
25    ctc tac tgg agt cgc cac act ggg aga ctc cac ttg cgc tat ggc aag      641
      Leu Tyr Trp Ser Arg His Thr Gly Arg Leu His Leu Arg Tyr Gly Lys
                        95              100             105
```

```
      cat gac tac ctg ctt agt agc caa gcc tcc aga ctc ctc tgc ttc cag      689
30    His Asp Tyr Leu Leu Ser Ser Gln Ala Ser Arg Leu Leu Cys Phe Gln
                   110             115             120
```

```
      aaa cag gag cag agc ctg aag cag gga gcc ccg ctg atc gcc acc tct      737
      Lys Gln Glu Gln Ser Leu Lys Gln Gly Ala Pro Leu Ile Ala Thr Ser
35       125             130             135
```

```
      gtc agc tcc tgg cag att ccc cag aac acc agc ctg cct ggg gct ccg      785
      Val Ser Ser Trp Gln Ile Pro Gln Asn Thr Ser Leu Pro Gly Ala Pro
      140             145             150             155
40
```

```
      agc ttc atc ttc tcc ttc cac aat gcc cca cac aag gtc tcc cac aat      833
      Ser Phe Ile Phe Ser Phe His Asn Ala Pro His Lys Val Ser His Asn
                        160             165             170
```

```
45    gca tct gtg gac atg tgt gat ctc aag aag gaa ttg cag cag ctt agc      881
      Ala Ser Val Asp Met Cys Asp Leu Lys Lys Glu Leu Gln Gln Leu Ser
                   175             180             185
```

```
      agg tac ctg cag cac cct caa aag gct gcc aag cgg ccc acc gca gcg      929
50    Arg Tyr Leu Gln His Pro Gln Lys Ala Ala Lys Arg Pro Thr Ala Ala
                   190             195             200
```

```
      ttc atc agc cag cag tta cag agc ctg gag tca aag ctg acc tct gtg      977
```

```
        Phe Ile Ser Gln Gln Leu Gln Ser Leu Glu Ser Lys Leu Thr Ser Val
            205                 210                 215


        agc ttc ctg gga gac aca tta tcc ttt gag gag gac cgg gtc aat gct      1025
   5    Ser Phe Leu Gly Asp Thr Leu Ser Phe Glu Glu Asp Arg Val Asn Ala
        220                 225                 230                 235


        aca gtg tgg aag ctg cca ccc aca gcc ggt cta gag gat ctg cat atc      1073
        Thr Val Trp Lys Leu Pro Pro Thr Ala Gly Leu Glu Asp Leu His Ile
   10                   240                 245                 250


        cac tcc cag aag gag gag gag cag agt gag gtc cag gca tac tcg ctg      1121
        His Ser Gln Lys Glu Glu Glu Gln Ser Glu Val Gln Ala Tyr Ser Leu
                        255                 260                 265
   15

        ttg ctt ccc cgg gcc gta ttc cag cag acc aga ggc cgt cgc cgg gat      1169
        Leu Leu Pro Arg Ala Val Phe Gln Gln Thr Arg Gly Arg Arg Arg Asp
                    270                 275                 280

   20   gac gcc aag agg ctc ctg gta gta gac ttc agc agc caa gct ttg ttc      1217
        Asp Ala Lys Arg Leu Leu Val Val Asp Phe Ser Ser Gln Ala Leu Phe
                    285                 290                 295


        cag gac aag aat tct agc caa gtc ctg ggt gag aag gtc ttg ggt att      1265
   25   Gln Asp Lys Asn Ser Ser Gln Val Leu Gly Glu Lys Val Leu Gly Ile
        300                 305                 310                 315


        gtc gtg cag aac acc aaa gtc acc aac ctc tca gat ccg gtg gta ctc      1313
        Val Val Gln Asn Thr Lys Val Thr Asn Leu Ser Asp Pro Val Val Leu
   30                   320                 325                 330


        acc ttc cag cac cag cct cag cca aaa aat gtg act ctg cag tgc gtg      1361
        Thr Phe Gln His Gln Pro Gln Pro Lys Asn Val Thr Leu Gln Cys Val
                        335                 340                 345
   35
        ttc tgg gtt gaa gac ccg gca tca agc agc aca ggg agc tgg agc agt      1409
        Phe Trp Val Glu Asp Pro Ala Ser Ser Ser Thr Gly Ser Trp Ser Ser
                    350                 355                 360


   40   gca ggc tgc gag aca gtg agc aga gac aca cag aca tcc tgc ctg tgc      1457
        Ala Gly Cys Glu Thr Val Ser Arg Asp Thr Gln Thr Ser Cys Leu Cys
            365                 370                 375


        aac cac ctg acc tac ttt gca gtg ctg atg gtg tca tcc aca gag gta      1505
   45   Asn His Leu Thr Tyr Phe Ala Val Leu Met Val Ser Ser Thr Glu Val
        380                 385                 390                 395


        gaa gcc act cac aaa cac tac ctc acg ctc ctg tcc tac gtg ggc tgt      1553
        Glu Ala Thr His Lys His Tyr Leu Thr Leu Leu Ser Tyr Val Gly Cys
   50                   400                 405                 410


        gtc atc tct gct ctg gct tgt gtc ttc act atc gct gcc tac ctc tgc      1601
        Val Ile Ser Ala Leu Ala Cys Val Phe Thr Ile Ala Ala Tyr Leu Cys
```

```
                 415                    420              425

     tcc agg agg aag tca cgt gac tac acc atc aaa gtc cac atg aac ctg    1649
     Ser Arg Arg Lys Ser Arg Asp Tyr Thr Ile Lys Val His Met Asn Leu
  5          430                435              440

     ctg tcc gct gtc ttc ctg ctg gac gtg agc ttc ctg ctc agc gag cct    1697
     Leu Ser Ala Val Phe Leu Leu Asp Val Ser Phe Leu Leu Ser Glu Pro
         445                450              455
 10
     gtg gca ctg acg ggc tcc gaa gca gcc tgt cgc acc agt gcc atg ttc    1745
     Val Ala Leu Thr Gly Ser Glu Ala Ala Cys Arg Thr Ser Ala Met Phe
     460                465                470                475

 15  ctg cac ttc tcc ctg ctt gcc tgc ctc tcc tgg atg ggc ctc gag ggc    1793
     Leu His Phe Ser Leu Leu Ala Cys Leu Ser Trp Met Gly Leu Glu Gly
                     480                485              490

     tac aat ctc tac cga ctg gtg gtg gag gtc ttc ggt acc tat gtg ccc    1841
 20  Tyr Asn Leu Tyr Arg Leu Val Val Glu Val Phe Gly Thr Tyr Val Pro
                 495                500              505

     ggc tat ctg ctc aag ctg agc atc gtg ggc tgg ggt ttt cct gtc ttc    1889
     Gly Tyr Leu Leu Lys Leu Ser Ile Val Gly Trp Gly Phe Pro Val Phe
 25          510                515              520

     ctg gtc act ctg gtg gcg ttg gtg gat gtg aat aac tac ggc ccc att    1937
     Leu Val Thr Leu Val Ala Leu Val Asp Val Asn Asn Tyr Gly Pro Ile
         525                530              535
 30
     atc cta gct gtg cgc cgg act ccg gaa cgt gtc acc tac ccc tct atg    1985
     Ile Leu Ala Val Arg Arg Thr Pro Glu Arg Val Thr Tyr Pro Ser Met
     540                545                550                555

 35  tgc tgg atc cgg gac tcc ctg gtg agc tat gtc acc aac ctg ggc ctc    2033
     Cys Trp Ile Arg Asp Ser Leu Val Ser Tyr Val Thr Asn Leu Gly Leu
                     560                565              570

     ttc agt ctg gtg ttc ctg ttc aac ctg gct atg ctg gcc acc atg gtg    2081
 40  Phe Ser Leu Val Phe Leu Phe Asn Leu Ala Met Leu Ala Thr Met Val
                 575                580              585

     gtg cag atc ctg cgg ctt cgc ccg cac agc cag aac tgg ccc cac gtg    2129
     Val Gln Ile Leu Arg Leu Arg Pro His Ser Gln Asn Trp Pro His Val
 45          590                595              600

     ctg acc ctg ctg ggc ctc agc ctg gtc ctt ggc ctc ccc tgg gcc ttg    2177
     Leu Thr Leu Leu Gly Leu Ser Leu Val Leu Gly Leu Pro Trp Ala Leu
         605                610              615
 50
     gtc ttc ttt tcc ttt gct tcc ggc acc ttc cag ctt gtc atc ctc tac    2225
     Val Phe Phe Ser Phe Ala Ser Gly Thr Phe Gln Leu Val Ile Leu Tyr
     620                625                630                635
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```
     ctc ttc agc atc ata act tcc tac caa ggc ttc ctc atc ttc ctg tgg      2273
     Leu Phe Ser Ile Ile Thr Ser Tyr Gln Gly Phe Leu Ile Phe Leu Trp
                 640             645                 650
 5
     tac tgg tcc atg cgg ttc cag gcc caa ggc ggc ccc tcc cct ctg aag      2321
     Tyr Trp Ser Met Arg Phe Gln Ala Gln Gly Gly Pro Ser Pro Leu Lys
                 655             660                 665

10   aac aac tca gac agc gcc aaa ctc ccc atc agc tcc ggc agc acc tcc      2369
     Asn Asn Ser Asp Ser Ala Lys Leu Pro Ile Ser Ser Gly Ser Thr Ser
                 670             675                 680

     tcc agc cgc atc taa gccaccgcca cacctcccct ccgggaggac acatgcatgg      2424
15   Ser Ser Arg Ile
             685

     cgtccgctca cgatgtctgt ggcccagtgc tgtgcccacc cagcctttgt tggttagtgg    2484

20   catactagag aaggccctgg tccttgaagg cgtagggctg ttgctctgag ggacctccat    2544

     ctctcctgaa gcctcctccc tctggcaagt actgggatac agccaccctt caacccagc     2604

     actctgaaga ccaagacagc cccctctggt gacactggcc aagcttgatc tttttcctaa    2664
25
     gaagtggtct tcagatcccc gcaggtcgct cagaagacac tgggctgcct agtgtgaatt    2724

     ctgtcctact aacgtacagt gagcagctcc tcacccccac ccccgcaaaa gctctcacca    2784

30   agtcctggag tgtcaggcag ggggctggaa atccaggagg acttcctgca aaaggcagca    2844

     tttcatcttg acctcagcct tcaggttggg gagaatgttc tttttaaata ccagttcatt    2904

     tgtcttttga tattaaagct ctttatagag agtctggaaa ctgtaggcga ttgtcgagaa    2964
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45   <213>   murine GPR56


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        Phe Ser Leu Val Gln Gly Ala His Ser Gly Ser Pro Arg Glu Asp Phe
                    20              25              30

 5
        Arg Phe Cys Gly Gln Arg Asn Gln Thr Gln Gln Ser Thr Leu His Tyr
                    35              40              45


10      Asp Gln Ser Ser Glu Pro His Ile Phe Val Trp Asn Thr Glu Glu Thr
                    50              55              60


        Leu Thr Ile Arg Ala Pro Phe Leu Ala Ala Pro Asp Ile Pro Arg Phe
15      65              70              75              80


        Phe Pro Glu Pro Arg Gly Leu Tyr His Phe Cys Leu Tyr Trp Ser Arg
                        85              90              95
20

        His Thr Gly Arg Leu His Leu Arg Tyr Gly Lys His Asp Tyr Leu Leu
                    100             105             110


25
        Ser Ser Gln Ala Ser Arg Leu Leu Cys Phe Gln Lys Gln Glu Gln Ser
                    115             120             125


30      Leu Lys Gln Gly Ala Pro Leu Ile Ala Thr Ser Val Ser Ser Trp Gln
                    130             135             140


        Ile Pro Gln Asn Thr Ser Leu Pro Gly Ala Pro Ser Phe Ile Phe Ser
35      145             150             155             160


        Phe His Asn Ala Pro His Lys Val Ser His Asn Ala Ser Val Asp Met
                        165             170             175
40

        Cys Asp Leu Lys Lys Glu Leu Gln Gln Leu Ser Arg Tyr Leu Gln His
                    180             185             190


45
        Pro Gln Lys Ala Ala Lys Arg Pro Thr Ala Ala Phe Ile Ser Gln Gln
                    195             200             205


50      Leu Gln Ser Leu Glu Ser Lys Leu Thr Ser Val Ser Phe Leu Gly Asp
                    210             215             220
```

```
    Thr Leu Ser Phe Glu Glu Asp Arg Val Asn Ala Thr Val Trp Lys Leu
    225             230             235                     240

5   Pro Pro Thr Ala Gly Leu Glu Asp Leu His Ile His Ser Gln Lys Glu
                    245             250                 255

    Glu Glu Gln Ser Glu Val Gln Ala Tyr Ser Leu Leu Leu Pro Arg Ala
10              260             265             270

    Val Phe Gln Gln Thr Arg Gly Arg Arg Arg Asp Asp Ala Lys Arg Leu
        275             280             285
15

    Leu Val Val Asp Phe Ser Ser Gln Ala Leu Phe Gln Asp Lys Asn Ser
        290             295             300

20
    Ser Gln Val Leu Gly Glu Lys Val Leu Gly Ile Val Val Gln Asn Thr
    305             310             315                     320

25  Lys Val Thr Asn Leu Ser Asp Pro Val Val Leu Thr Phe Gln His Gln
                    325             330             335
      .

    Pro Gln Pro Lys Asn Val Thr Leu Gln Cys Val Phe Trp Val Glu Asp
30              340             345             350

    Pro Ala Ser Ser Ser Thr Gly Ser Trp Ser Ser Ala Gly Cys Glu Thr
            355             360             365
35

    Val Ser Arg Asp Thr Gln Thr Ser Cys Leu Cys Asn His Leu Thr Tyr
        370             375             380

40
    Phe Ala Val Leu Met Val Ser Ser Thr Glu Val Glu Ala Thr His Lys
    385             390             395                     400

45  His Tyr Leu Thr Leu Leu Ser Tyr Val Gly Cys Val Ile Ser Ala Leu
                    405             410             415

    Ala Cys Val Phe Thr Ile Ala Ala Tyr Leu Cys Ser Arg Arg Lys Ser
50          420             425             430

    Arg Asp Tyr Thr Ile Lys Val His Met Asn Leu Leu Ser Ala Val Phe
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```
                    435                   440                   445


       Leu Leu Asp Val Ser Phe Leu Leu Ser Glu Pro Val Ala Leu Thr Gly
   5       450             455             460


       Ser Glu Ala Ala Cys Arg Thr Ser Ala Met Phe Leu His Phe Ser Leu
       465             470             475             480
  10

       Leu Ala Cys Leu Ser Trp Met Gly Leu Glu Gly Tyr Asn Leu Tyr Arg
                       485             490             495

  15
       Leu Val Val Glu Val Phe Gly Thr Tyr Val Pro Gly Tyr Leu Leu Lys
                   500             505             510


  20   Leu Ser Ile Val Gly Trp Gly Phe Pro Val Phe Leu Val Thr Leu Val
                   515             520             525


       Ala Leu Val Asp Val Asn Asn Tyr Gly Pro Ile Ile Leu Ala Val Arg
  25       530             535             540


       Arg Thr Pro Glu Arg Val Thr Tyr Pro Ser Met Cys Trp Ile Arg Asp
       545             550             555             560
  30

       Ser Leu Val Ser Tyr Val Thr Asn Leu Gly Leu Phe Ser Leu Val Phe
                   565             570             575

  35
       Leu Phe Asn Leu Ala Met Leu Ala Thr Met Val Val Gln Ile Leu Arg
                   580             585             590


  40   Leu Arg Pro His Ser Gln Asn Trp Pro His Val Leu Thr Leu Leu Gly
               595             600             605


       Leu Ser Leu Val Leu Gly Leu Pro Trp Ala Leu Val Phe Phe Ser Phe
  45       610             615             620


       Ala Ser Gly Thr Phe Gln Leu Val Ile Leu Tyr Leu Phe Ser Ile Ile
       625             630             635             640
  50

       Thr Ser Tyr Gln Gly Phe Leu Ile Phe Leu Trp Tyr Trp Ser Met Arg
                   645             650             655
```

```
        Phe Gln Ala Gln Gly Gly Pro Ser Pro Leu Lys Asn Asn Ser Asp Ser
                    660                 665                 670
5


        Ala Lys Leu Pro Ile Ser Ser Gly Ser Thr Ser Ser Ser Arg Ile
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10
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25      <210>   12

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        <212>   DNA
30
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35      <400>   12
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30
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40
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Met Thr Pro Gln Ser Leu Leu Gln Thr Thr
1   5   10

45